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spatially addressable electrodes forming the array of materials, wherein at least two members of the array of materials have different compositions;

a detector for measuring the electrical property of the members of the array of materials, with the spatially addressable electrodes electrically connected to the detector; and

reference electrodes having ends located adjacent ends of the spatially addressable electrodes;

wherein the spatially addressable electrodes, the at least one other electrode and the reference electrodes are adapted to apply the independently variable electrical potential between each of the spatially addressable electrode and the at least one other electrode.

ε² 51. An apparatus for making an array of different materials by electrochemical deposition, the array of materials having a plurality of members, the apparatus comprising:

a first chamber having an inlet for supplying a first ionic solution to the first chamber and an outlet for removing the first ionic solution from the first chamber;

a second chamber having an inlet for supplying a second ionic solution to the second chamber and an outlet for removing the second ionic solution from the second chamber;

a permeable membrane separating the first chamber from the second chamber, the permeable membrane allowing ions to migrate between the first chamber and the second chamber;

a substrate located in the first chamber, the substrate having predefined regions for receiving members of the array of materials;

an array of working electrodes having ends located adjacent each corresponding predefined region, the ends of the working electrodes discretely and electrically connected to the predefined regions and each of the working electrodes being fixed in the same predefined region throughout array formation;

reference electrodes having ends located adjacent the ends of the working electrodes; and

a counter electrode located in the second chamber;

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wherein the working electrodes, the reference electrodes and the counter electrode are adapted to apply an independently variable electrical condition between each of the predefined regions and the counter electrode so that ions undergo chemical reaction at the predefined regions of the substrate to form the array of materials in which at least more than nine members of the array of materials have different compositions.

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70. An apparatus for making and screening an array of materials by electrochemical deposition, the array of materials having a plurality of members, the apparatus comprising:

a substrate having predefined regions for receiving the members of the array of materials;

an array of spatially addressable electrodes coupled with the substrate at the predefined regions;

at least one other electrode, the at least one other electrode and the spatially addressable electrodes adapted to apply an independently controllable electrical condition between each of the predefined regions and the at least one other electrode so that when the substrate contacts a source material provided in a solution containing ions, ions in said solution undergo chemical reaction at the predefined regions forming the array of materials in which at least two members of the array of materials are different; and

means for screening for a common selected property of the members of the array of materials while the members of the array of materials are on the substrate.

71. The apparatus of claim 70 wherein said means for screening includes a scanning device.

72. The apparatus of claim 70 wherein said means for screening is capable of screening for catalytic activity.

73. The apparatus of claim 70, wherein said means for screening is capable of electrochemical screening.

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74. An apparatus for housing an array of materials prepared by electrochemical deposition, the array of materials having a plurality of members, the apparatus comprising:

a substrate having a plurality of predefined regions defining an array including more than nine different uncharacterized electrochemically deposited inorganic materials;

an array of spatially addressable electrodes discretely coupled with the substrate at each of the predefined regions; and

at least one other electrode, the at least one other electrode and the spatially addressable electrodes adapted to apply an independently controllable electrical condition between each of the predefined regions and the at least one other electrode so that when the substrate contacted a source material provided in a solution containing ions, ions in said solution underwent chemical reaction at the predefined regions forming the array of materials.

75. The apparatus of claim 74, further comprising means for screening members of the array for a common selected property.

21 76. The apparatus of claim ¹⁹74 or ²⁰75, wherein said array includes more than nine uncharacterized catalyst candidates.

21 77. The apparatus of claim ²¹76, wherein said array includes at least 9 uncharacterized catalyst candidates selected from ternary and higher order metal alloys.

21 78. The apparatus of claim ²¹76, wherein said array includes at least 9 uncharacterized catalyst candidates selected from the system including Pt-Ru-Sn materials.

19 20 79. The apparatus of claim ¹⁹74 or ²⁰78, wherein said array includes at least 9 uncharacterized phosphor candidates.